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Swallowing-Induced Neck Bulging and Internal Jugular Vein Distension in Omohyoid Muscle Syndrome

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Abstract

Omohyoid muscle syndrome (OMS) is a rare cause of transient lateral neck swelling that appears during swallowing and may be missed when imaging is performed only at rest. A 46-year-old man presented with swallowing-related pain and a transient right-sided neck bulge that appeared exclusively during swallowing. Fiberoptic endoscopic evaluation of swallowing and cervical computed tomography showed no relevant abnormalities. Dynamic cervical ultrasonography demonstrated anterior displacement and superficial prominence of the omohyoid muscle together with marked distension of the underlying right internal jugular vein during swallowing. Both changes subsided immediately after swallowing and were reproducible with repeated swallows, corresponding to the appearance and disappearance of the external neck bulge. These findings were considered consistent with OMS. Because the symptoms were tolerable, conservative observation was selected. This case illustrates that ultrasonography performed during the provoking maneuver can simultaneously demonstrate muscular and vascular changes underlying swallowing-induced neck bulging that are not apparent on static imaging.

Categories: Radiology, Otolaryngology
Keywords: dynamic imaging, internal jugular vein, neck swelling, omohyoid muscle syndrome, swallowing, ultrasonography

Introduction

Omohyoid muscle syndrome (OMS) is a rare condition characterized by transient lateral neck swelling during swallowing. The swelling is typically absent at rest and appears only during swallowing, reflecting the dynamic nature of the disorder. Abnormal movement of the omohyoid muscle related to dysfunction of its intermediate tendon and surrounding fascial structures has been implicated in its pathogenesis. Because the abnormality occurs only during a specific physiological maneuver, conventional static imaging may be unrevealing, whereas real-time ultrasonography can directly demonstrate abnormal movement of the affected omohyoid muscle and adjacent cervical structures [1-3]. Swallowing dynamic computed tomography has also been used to visualize dynamic structural changes associated with OMS [4].

Previous ultrasonographic reports have primarily focused on abnormal movement and anterior bulging of the omohyoid muscle during swallowing [1-3]. Changes in internal jugular vein (IJV) caliber have also been described in association with OMS [5,6]. However, the dynamic relationship among muscular displacement, venous distension, and the externally visible neck bulge has been less well characterized. We report a patient with OMS in whom ultrasonography performed during swallowing demonstrated simultaneous anterior displacement of the omohyoid muscle and marked distension of the underlying IJV.

Case Presentation

A 46-year-old man presented with swallowing-related pain and transient right-sided neck swelling that appeared exclusively during swallowing. He reported frequent episodes of sneezing shortly before symptom onset. The swelling was absent at rest, appeared reproducibly with each swallow, and disappeared immediately thereafter.

Physical examination at rest revealed no apparent cervical mass. During swallowing, however, focal bulging became evident in the right lateral neck (Figure *1*; Video *1*). Fiberoptic endoscopic evaluation of swallowing showed no relevant abnormalities of the pharynx or larynx. Cervical computed tomography performed at rest likewise revealed no structural lesion that could account for the intermittent neck swelling.

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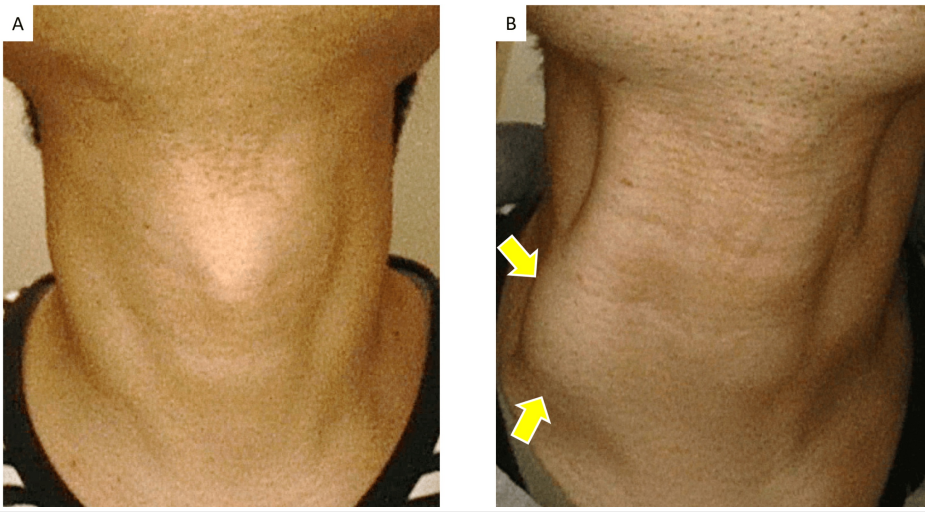
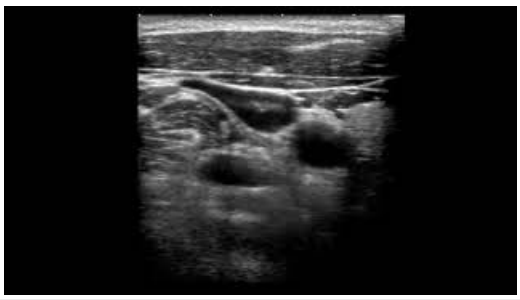


FIGURE 1: Swallowing-induced neck bulging in omohyoid muscle syndrome

(A) No apparent neck bulging is visible at rest. (B) During swallowing, transient focal bulging appears in the right lateral neck (arrows).



VIDEO 1: Clinical and ultrasonographic findings of omohyoid muscle syndrome during swallowing

The first part demonstrates the right lateral neck at rest and during swallowing. A transient lateral neck bulge appears during swallowing and subsides thereafter. The second part shows ultrasonography of the right neck during swallowing. At rest, the right internal jugular vein is partially collapsed deep to the omohyoid muscle. During swallowing, the omohyoid muscle is displaced anteriorly and becomes more superficially prominent, while the underlying internal jugular vein simultaneously becomes markedly distended. Both changes subside after swallowing.

View video here: https://youtu.be/mJA0CXzBt4A

Cervical ultrasonography was subsequently performed during swallowing using an Aplio 400 ultrasound system (TUS-A400; Toshiba Medical Systems Corporation, Otawara, Japan) with an 18L7 linear-array transducer (frequency range: 4.5-18.0 MHz). At rest, the right IJV was partially collapsed deep to the omohyoid muscle (Figure *2A*). During swallowing, the omohyoid muscle was clearly displaced anteriorly and became more superficially prominent, while the underlying IJV simultaneously became markedly distended (Figure *2B*; Video *1*). These changes occurred in association with the appearance of the external neck bulge. After swallowing, the anterior prominence of the omohyoid muscle and venous distension subsided, and the IJV rapidly returned to its resting configuration. These dynamic changes were reproducible during repeated swallows.

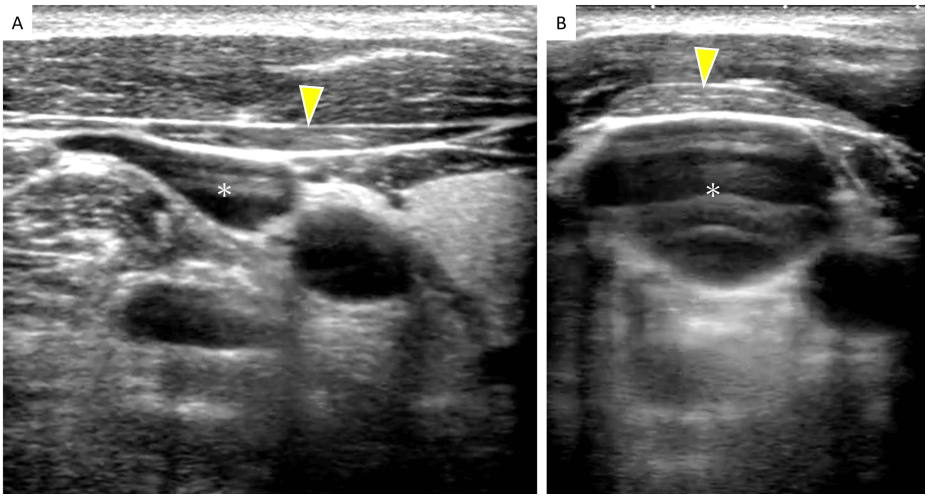


FIGURE 2: Ultrasonographic findings of omohyoid muscle syndrome during swallowing

(A) At rest, the right internal jugular vein (asterisk) is partially collapsed deep to the omohyoid muscle (arrowhead). (B) During swallowing, the omohyoid muscle is displaced anteriorly and becomes more superficially prominent (arrowhead), while the underlying right internal jugular vein becomes markedly distended (asterisk).

These clinical and ultrasonographic findings were considered consistent with OMS. Treatment options, including ultrasound-guided botulinum toxin injection and surgical transection or resection of the omohyoid muscle, were discussed with the patient. Because the symptoms were tolerable, he elected conservative observation.

Discussion

The pathophysiology of OMS remains incompletely understood. Dysfunction or laxity of the fascial sling surrounding the intermediate tendon has traditionally been proposed to permit abnormal movement of the omohyoid muscle during swallowing [1,7]. Alternative mechanisms involving adhesion or altered mechanical interaction between the omohyoid and sternocleidomastoid muscles have also been proposed [5]. Loss or alteration of normal restraint may allow the omohyoid muscle to bowstring anteriorly during swallowing and elevate the overlying soft tissues, producing the characteristic transient lateral neck bulge.

Mechanical stress may contribute to the development of OMS in some patients. A preceding traumatic event was identified in approximately 20% of reported cases in a systematic review [7]. OMS has also been described following substantial mechanical stress to the neck, including a rear-naked chokehold in a mixed martial arts athlete and cervical sprain [8,9]. In the present patient, frequent episodes of sneezing occurred shortly before symptom onset. Although a causal relationship cannot be established and sneezing has not been established as a precipitating factor for OMS, repeated sneezing may have acted as a mechanical stressor on a susceptible fascial retaining mechanism of the omohyoid muscle. This possibility remains hypothetical.

Dynamic imaging is particularly useful for OMS because the characteristic abnormality may not be apparent on examinations performed at rest. Abnormal omohyoid movement during swallowing has been demonstrated using real-time ultrasonography and clinical videography, and subsequent reports have further supported the diagnostic value of ultrasonography performed during swallowing [1-3,10]. In a series of 11 patients, the affected omohyoid muscle showed thickening and forward bulging during swallowing, with elevation of the overlying sternocleidomastoid muscle [3]. More recently, abnormal omohyoid movement has also been visualized using ultrasonography and swallowing dynamic computed tomography, further illustrating the value of imaging during swallowing [4]. Thus, dynamic displacement of the omohyoid muscle itself is a recognized imaging feature of OMS.

The distinctive feature of the present case was the simultaneous visualization of muscular and vascular changes within the same ultrasonographic field. During swallowing, the omohyoid muscle was displaced anteriorly and became more superficially prominent, while the underlying IJV showed marked distension. Both changes subsided promptly after swallowing. The externally visible neck bulge therefore appeared to reflect contributions from both abnormal prominence of the omohyoid muscle and associated venous distension rather than venous enlargement alone. The paired clinical and ultrasonographic recordings provide a direct visual demonstration of this dynamic phenomenon.

The anatomical relationship between the omohyoid muscle and the IJV may be relevant to these findings. Direct adhesion of the intermediate tendon to the anterior wall of the IJV, together with an additional connection through a thin lamina of the pretracheal layer of the cervical fascia, has been demonstrated anatomically [11]. This close relationship provides a potential anatomical basis for changes in venous configuration accompanying omohyoid movement. Ipsilateral IJV enlargement has also been reported in association with OMS, with altered tension transmitted through the cervical fascia proposed as a possible mechanism affecting IJV caliber [5].

Nevertheless, the physiological role of the omohyoid muscle in regulating IJV configuration remains uncertain. Available evidence regarding its hemodynamic role is limited, although a possible contribution to maintaining IJV patency has been proposed [12]. Therefore, the marked IJV distension observed in the present patient should be regarded as an associated dynamic finding rather than evidence of a specific causal mechanism.

Transient IJV dilation has previously been described in association with concurrent IJV phlebectasia and omohyoid sling syndrome [6]. In that report, neck swelling was elicited by the Valsalva maneuver and became more prominent during swallowing, and ultrasonography demonstrated transient IJV dilation. Because a Valsalva maneuver was not performed in our patient, concomitant IJV phlebectasia was not specifically assessed and therefore cannot be excluded. Nevertheless, the IJV showed a striking phasic change, from a partially collapsed configuration at rest to marked distension during swallowing, followed by rapid return to its resting configuration. Importantly, ultrasonography performed during swallowing simultaneously demonstrated anterior displacement of the overlying omohyoid muscle, indicating that the transient neck bulge reflected more than venous dilation alone.

The differential diagnosis of intermittent lateral neck swelling includes other dynamic conditions such as IJV phlebectasia, laryngocele, and pharyngocele. Such abnormalities may become evident only during specific physiological maneuvers and may therefore be missed by imaging performed exclusively at rest. In OMS, the close temporal relationship between the swelling and swallowing, together with dynamic displacement of the omohyoid muscle, provides an important diagnostic clue. This case illustrates the broader value of examining intermittent abnormalities during the maneuver that provokes them.

Management of OMS depends primarily on symptom severity and includes observation, ultrasound-guided botulinum toxin injection, and surgical treatment [2,5,7]. Conservative management has been associated with a favorable course in many reported patients, whereas invasive treatment is generally considered for patients substantially troubled by symptoms or cosmetic concerns [7]. Because the symptoms in our patient were tolerable, conservative observation was selected.

Conclusions

OMS should be considered when lateral neck bulging is reproducibly induced by swallowing and conventional static evaluation is unrevealing. Ultrasonography performed during swallowing is particularly useful in this setting because it can directly depict cervical soft tissue movement during the symptom-provoking maneuver. In the present case, ultrasonography performed during swallowing demonstrated anterior displacement and superficial prominence of the omohyoid muscle together with distension of the underlying IJV, providing insight into the anatomical changes associated with the visible swelling. Imaging during the provoking maneuver can therefore provide clinically useful information in patients with intermittent neck abnormalities.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Ken Iwanaga, Atsushi Suehiro, Ichiro Tateya

Acquisition, analysis, or interpretation of data: Ken Iwanaga, Takehiro Iki

Drafting of the manuscript: Ken Iwanaga

Critical review of the manuscript for important intellectual content: Ken Iwanaga, Atsushi Suehiro, Takehiro Iki, Ichiro Tateya

Supervision: Ichiro Tateya

Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all

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